

Claims

[c1] What is claimed is:

1. A crystal growing apparatus comprising:
a receptacle constructed to receive a material selected to grow a crystal; and
an induction heater having a Litz coil and constructed to heat the material.

[c2] 2. The crystal growing apparatus of claim 1 further comprising a water passage extending through the induction heater and constructed to allow a water flow therethrough to cool the Litz coil.

[c3] 3. The crystal growing apparatus of claim 1 further comprising a controller electrically connected to a pair of ends of the Litz coil and constructed to pass an electrical signal therethrough.

[c4] 4. The crystal growing apparatus of claim 1 further comprising a rod constructed to initiate a pull of a crystal from the material.

[c5] 5. The crystal growing apparatus of claim 1 wherein the induction heater further comprises a hose constructed to receive the Litz coil therein.

- [c6] 6. The crystal growing apparatus of claim 5 further comprising a housing positioned about the hose and at least one leg constructed to be attached to the hose, the leg having an end which extends past an end of the housing.
- [c7] 7. The crystal growing apparatus of claim 6 further comprising at least one cable tie mount passing through the at least one leg and connected to the hose.
- [c8] 8. The crystal growing apparatus of claim 1 wherein the reservoir is constructed of a material that is responsive to induction heating.
- [c9] 9. An induction heater comprising:
a casing having a first end and a second end;
a coil of woven strands of wire having a first end and a second end and passing through the casing; and
a lead connected to an end of the coil of woven strands of wire and having a passage therethrough, the passage constructed to provide coolant to a space between the coil of woven strands of wire and the casing.
- [c10] 10. The induction heater of claim 9 wherein the individual wires of the coil of woven strands of wire are electrically isolated from one another along a length of the individual wires.

- [c11] 11. The induction heater of claim 9 wherein the coil of woven strands of wire is a Litz coil.
- [c12] 12. The induction heater of claim 9 further comprising at least one cable tie passing through a leg and engaged with at least a portion of the casing wherein the at least one cable tie maintains a spacing between an adjacent winding of the coil of woven strands of wire.
- [c13] 13. The induction heater of claim 9 further comprising a housing having an opening therethrough and extending about the casing.
- [c14] 14. The induction heater of claim 13 further comprising a fitting constructed to secure an end of the casing to the housing.
- [c15] 15. The induction heater of claim 9 further comprising a first and a second connector, each connector constructed to electrically connect a respective end of the coil of woven strands of wire to a power source.
- [c16] 16. The induction heater of claim 9 incorporated into a crystal growing device and constructed to heat a crystal growing material.
- [c17] 17. A method of manufacturing a crystal grower comprising:

providing a reservoir to receive a crystal growing material therein; and
coiling a Litz coil about the reservoir.

[c18] 18. The method of claim 17 further comprising energizing the coil of wire to heat the crystal growing material in the reservoir.

[c19] 19. The method of claim 17 wherein providing a reservoir includes forming a reservoir of a material resistant to induction heating.

[c20] 20. The method of claim 17 further comprising preventing atmospheric contamination of the crystal growing material by enclosing the reservoir.

[c21] 21. A method of growing a crystal comprising the steps of:
placing a crystal growing material in a vessel; and
energizing a coil of wire that is wound about the vessel having Litz characteristics.

[c22] 22. The method of claim 21 further comprising circulating coolant about the coil of wire to cool the coil of wire.

[c23] 23. The method of claim 21 further comprising pulling a crystal fiber from the crystal growing material in the vessel.

- [c24] 24. The method of claim 21 further comprising achieving a heating efficiency of at least 75%.
- [c25] 25. The method of claim 21 wherein the step of energizing includes no more than a 25% energy loss by the coil of wire.
- [c26] 26. The method of claim 25 wherein the step of energizing includes no more than an 18% energy loss by the coil of wire.
- [c27] 27. The method of claim 21 wherein the step of energizing results in induction heating of the vessel.
- [c28] 28. The method of claim 21 wherein the step of energizing results in induction heating of the crystal growing material.